HP Moonshot
Configuration and Compatibility Guide

Abstract

This guide describes HP Moonshot hardware configuration options and hardware and software compatibility rules. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

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Contents

Introduction 5
HP Moonshot overview 5
HP Moonshot devices 6
HP Moonshot 1500 Chassis 6
Cartridge slot and switch module bay identification 7
Management zones 8
Cartridges 9
HP ProLiant Moonshot Cartridge 9
Switch modules and uplink modules 9
HP Moonshot-45G Switch Module 9
HP Moonshot-6SFP Uplink Module 10
HP Moonshot 1500 Chassis Management Module 11
Power supplies 12
Fans 12
Software tools and solutions 14
Product QuickSpecs 14
HP Moonshot iLO Chassis Management Firmware 14
HP Moonshot iLO CM Integrated Management Log 14
HP Moonshot iLO CM Event Log 14
HP Insight Cluster Management Utility 14
HP Moonshot Component Pack 15
Configuration rules 16
Basic configuration rules 16
Cartridge population rules 16
Switch module and uplink module population rules 17
Power supply population rules 18
Fan population rules 18
Hardware compatibility 19
Hardware compatibility matrix 19
Software compatibility 20
Software compatibility matrix 20
Device mapping 21
HP ProLiant Moonshot Cartridge mapping 21
Support and other resources 24
Before you contact HP 24
HP contact information 24
Customer self repair 24
Acronyms and abbreviations 25
Documentation feedback 26
Index 27

Introduction

HP Moonshot overview

HP Moonshot is a super high density power and cooling optimized system, housed in a 4.3U chassis.

HP Moonshot is built using the following system components:

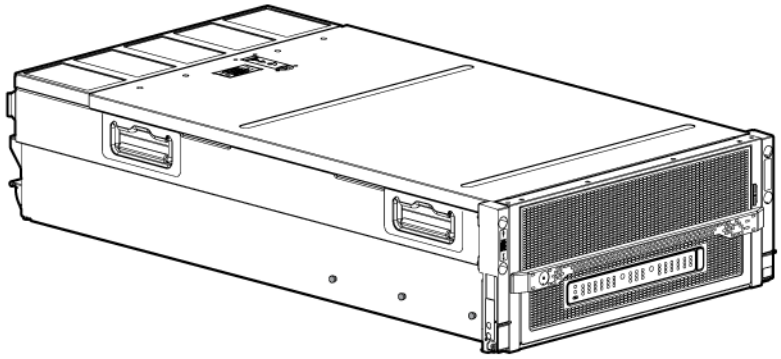
- Chassis
- Cartridges
- Switch modules and uplink modules
- HP Moonshot 1500 Chassis Management module
- Fans
- Power supplies

As described in this document, configurations vary depending on the cartridges and switches installed.

HP Moonshot devices

HP Moonshot 1500 Chassis

The HP Moonshot 1500 Chassis is a 4.3U, rack mounted chassis.



The chassis supports the following devices.

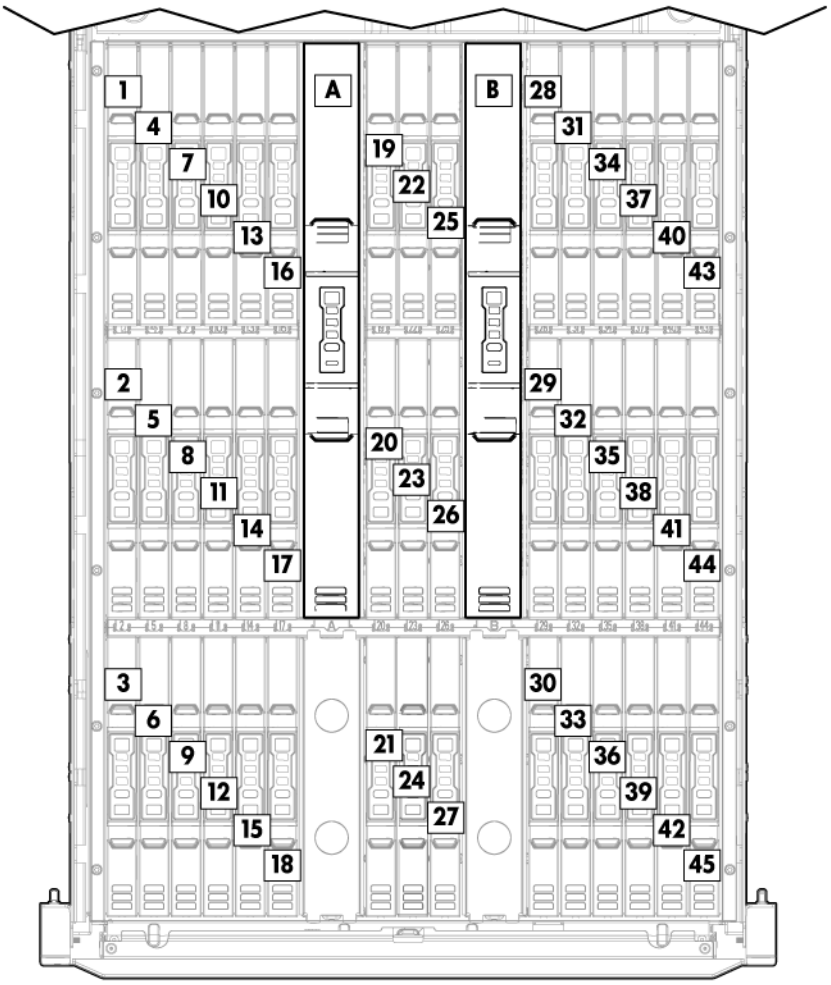
Component	Minimum	Maximum
Cartridges	*	45
Switch module and uplink module pairs	1	2
HP Moonshot 1500 Chassis Management module	1	1
Power supplies	2	4
Fans	5	5

* Dependent on the configuration

The system backplane on the bottom of the chassis identifies the installed cartridge model and switch module model information and routes communications from the cartridges to the internal switch modules, which is then available through the external uplink modules. For more information about these mappings, see "Device mapping (on page 21)."

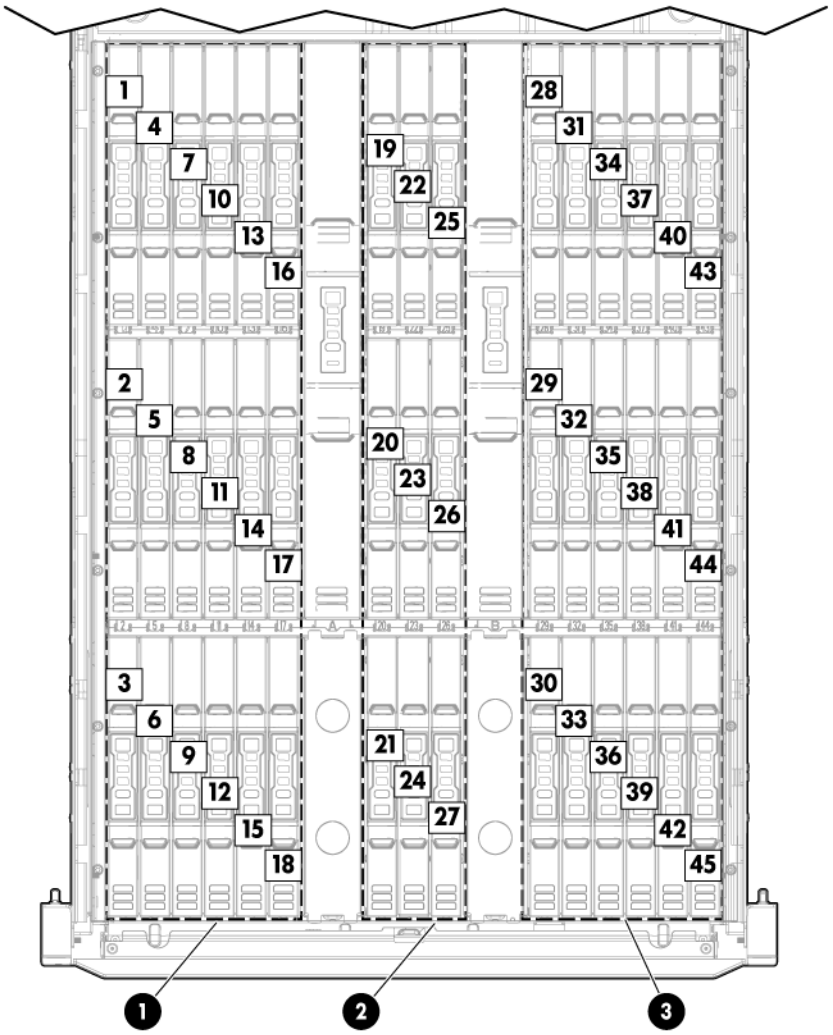
Cartridge slot and switch module bay identification

The chassis provides 45 cartridge slots (1-45) and two switch module bays (A-B).



Management zones

For some management tasks, the cartridge slots are divided into three management zones.

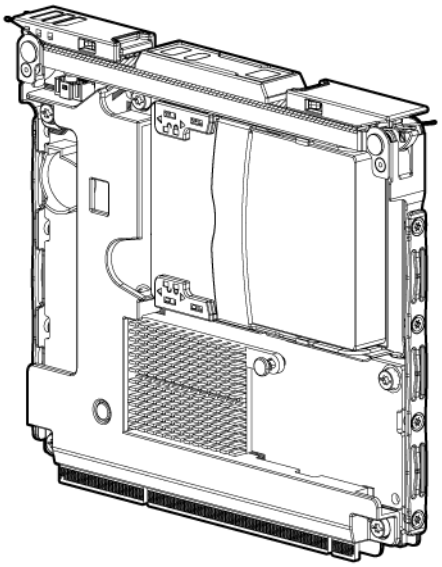


Item	Description
1	Cartridge management zone 1
2	Cartridge management zone 2
3	Cartridge management zone 3

Cartridges

HP ProLiant Moonshot Cartridge

The HP ProLiant Moonshot Cartridge is a single-node cartridge that can be installed in any of the 45 cartridge slots in the chassis.



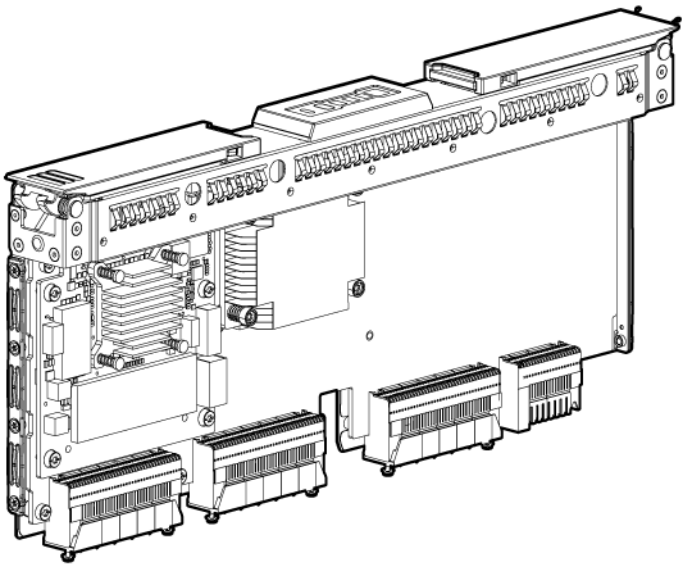
Item	Description
Workload	Direct hosting and limited web front end
Processor	One 2.0-GHz Intel Atom processor, 2 cores, 8.5 W, non-removable
Memory	One 1333MHz DIMM, DDR3 UDIMM SO-DIMM ECC (8GB)
Network	Onboard NIC: 1 dual-port 1GbE NIC per processor
Storage	SFF drive: • 500 GB • 1 TB
Boot	• Direct from drive • Network
Power	<15 W per cartridge
Operating system	• Ubuntu 12.04 • Red Hat Enterprise Linux 6.4 • SLES 11, service pack 2

Switch modules and uplink modules

HP Moonshot-45G Switch Module

The HP Moonshot-45G Switch Module is the internal partner to the external uplink module.

The switch module is installed inside the chassis, and the uplink module is installed in the rear of the chassis. The uplink module provides external access to the switch.



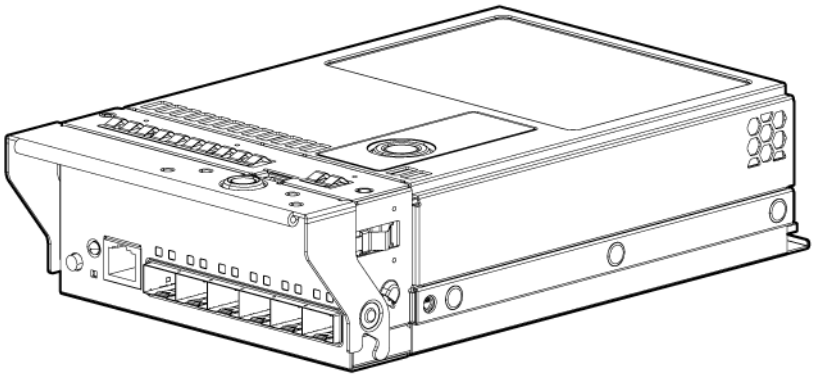
The switch module has the following key features:

- High density, low power
- Low latency switching performance
- 45 1GbE ports per switch module
- 6 10GbE uplink ports per switch module
- Dual switch modules provide traffic isolation or can be stacked for resiliency
- Rack level stacking to simplify management domain
- Configuration and management, with two tools:
  - HP Moonshot iLO Chassis Management Firmware
  - HP Moonshot-45G Switch Module CLI
- Layer 2, Layer 3 routing and QoS, Management (CLI, SNMP, SFLOW). No license keys required.

HP Moonshot-6SFP Uplink Module

The HP Moonshot-6SFP Uplink Module is the external outlet partner to an internal switch module.

The switch module is installed inside the chassis, and the uplink module is installed in the rear of the chassis. The uplink module provides external access to the switch module.

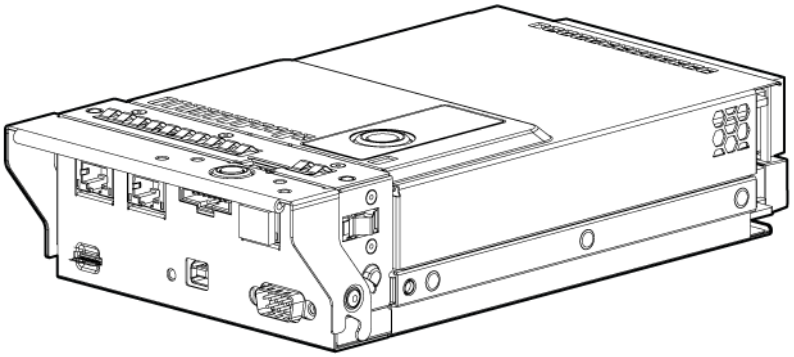


The uplink module has the following key features:

- Six 10GbE SFP+ uplink ports
- LEDs that provide health and link information about the uplink module
- Serial port, for out-of-band management

HP Moonshot 1500 Chassis Management Module

The Moonshot 1500 CM module is the gateway for system and network management.

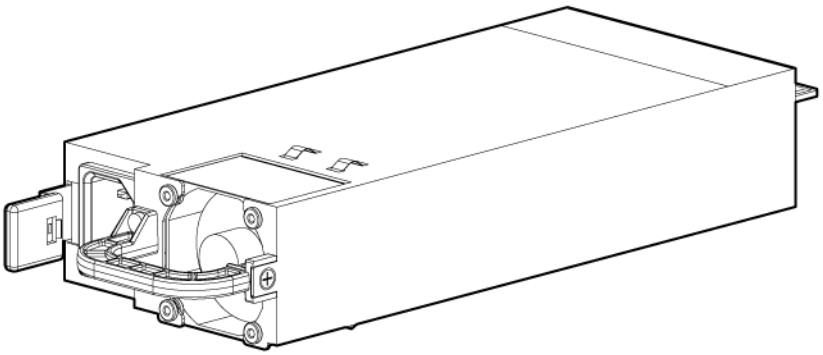


The Moonshot 1500 CM module has the following key features:

- Device neutral, low cost node solution
- IPMI and serial console for each server
- Single Ethernet port gateway
- HP Moonshot iLO CM Firmware, which aggregates to a common set of management interfaces
- SL-APM rack management, which spans rack or multiple racks
- True out-of-band firmware update services
- Service port to both switches for remote network management

Power supplies

Depending on the cartridges and switches installed, two to four power supplies are required to power the chassis. For more information, see "Power supply population rules (on page 18)."



The HP 1200W Common Slot Platinum Plus Hot Plug Power Supply supports the following:

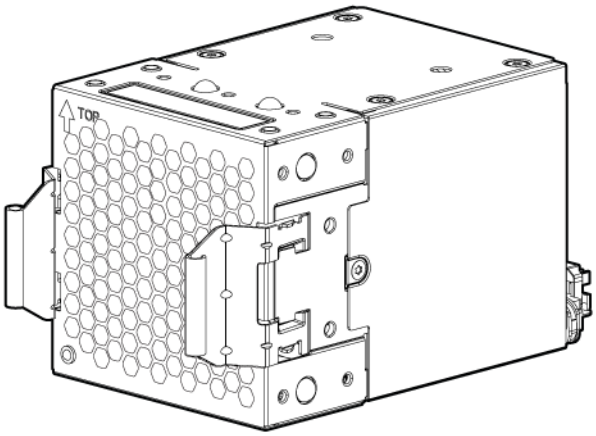
- Common slot design
- Power management for redundant power configurations

Fans

Five fans ship standard with the chassis. At all times, all five fans must be installed.

To boot and run the chassis, all five fans must be installed and operating. For more information, see "Fan population rules (on page 18)."

If a fan fails during operation, after flashing a red LED, iLO automatically initiates a graceful shutdown of all cartridges.



Each fan module has the following key features:

- Common slot design

- Two rotors

Software tools and solutions

Product QuickSpecs

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the HP Product Bulletin website (http://www.hp.com/go/productbulletin).

HP Moonshot iLO Chassis Management Firmware

Moonshot iLO CM firmware is the gateway for aggregated chassis management on HP Moonshot. The iLO CM firmware reduces cost and power by sharing four iLOs across the nodes and other Moonshot components. As a single point of access to the chassis, iLO CM firmware allows you to configure, update, and operate HP Moonshot through CLI, IPMI, and remote serial console access.

For more information, see the *HP Moonshot iLO Chassis Management Firmware User Guide* in the HP Moonshot Information Library (http://www.hp.com/go/moonshot/docs).

HP Moonshot iLO CM Integrated Management Log

The iLO CM IML records hundreds of events and stores them in an easy-to-view form. The iLO CM IML timestamps each event with 1-minute granularity. To view recorded events in the iLO CM IML, use the `show log iml` command in iLO CM firmware. To save the log, cut and paste the content from the session window or set session logging in the SSH client.

For more information, see the *HP Moonshot iLO Chassis Management Firmware User Guide* in the HP Moonshot Information Library (http://www.hp.com/go/moonshot/docs).

HP Moonshot iLO CM Event Log

The iLO CM Event Log is an operating system-independent log that maintains a record of events by date and time. Logged events include major events, such as a power outage or a reset, and iLO CM firmware events. To view recorded events in the iLO CM Event Log, use the `show log ilo` command in iLO CM firmware. To save the log, cut and paste the content from the session window or set session logging in the SSH client.

For more information, see the *HP Moonshot iLO Chassis Management Firmware User Guide* in the HP Moonshot Information Library (http://www.hp.com/go/moonshot/docs).

HP Insight Cluster Management Utility

HP Insight CMU is an efficient and robust hyperscale cluster lifecycle management framework and suite of tools for large Linux clusters. A simple graphical interface enables an at-a-glance view of the entire cluster across multiple metrics, provides frictionless scalable remote management and analysis, and allows rapid software provisioning to all system nodes. HP Insight CMU makes cluster management more user friendly, efficient, and error-free than if it were being managed by scripts, or on a node-by-node basis. HP Insight CMU is highly flexible and customizable, offers both GUI and CLI interfaces, and is used to deploy a range

of software environments, from simple compute farms to highly customized, application-specific configurations.

For more information on HP Insight CMU features and links to technical documentation, Quickspecs, and a product demo, see the HP website (http://www.hp.com/go/cmu).

To download the product, go to the HP Software Depot (https://h20392.www2.hp.com/portal/swdepot/index.do). Click **HP Insight Management**, then click **Insight Cluster Management**.

HP Moonshot Component Pack

MCP is a comprehensive firmware solution delivered as a single file. The solution is tested on the HP Moonshot and is delivered as a family of bundles. The MCP deploys firmware updates through a CLI that flashes the firmware components. Flashing the firmware components consists of delivering an update file to the iLO CM firmware, which distributes the flash file as appropriate. If you cannot be connected to the Internet during the setup, download the latest MCP from the HP website (http://www.hp.com/go/servers/moonshot/download).

Configuration rules

Basic configuration rules

Chassis configuration rules are dependent on the models and quantities of cartridges and switches installed, but consider the following basic rules:

- Fans must be installed in all fan bays.
- Sufficient power supplies must be installed to support the installed cartridges and switches.
- The internal switch module and external uplink module are a mated pair. If two switch modules are installed, two uplink modules are required.
- All internal and external slots and bays must be populated with modules or blanks for proper thermal cooling.

Cartridge population rules

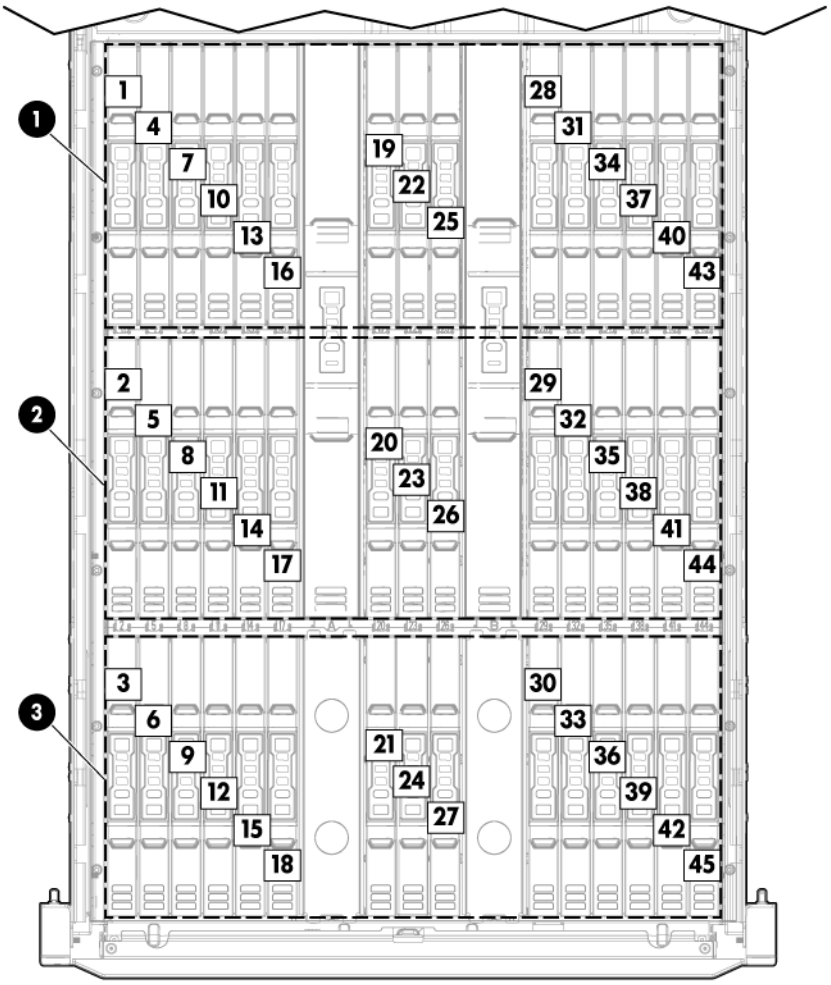
Cartridge configuration rules are maintained by the chassis, as each cartridge reports its model information to the Moonshot 1500 CM module.

When installing cartridges in the chassis, always populate the cartridge slots in rows, beginning in row 1, slot 1. Completely populate row 1, populate row 2, and then populate row 3.

If the chassis is powered on when adding cartridges:

- Cartridges must be installed one at a time.

- Elapsed time between removing the blank and installing the cartridge must not exceed 30 seconds.



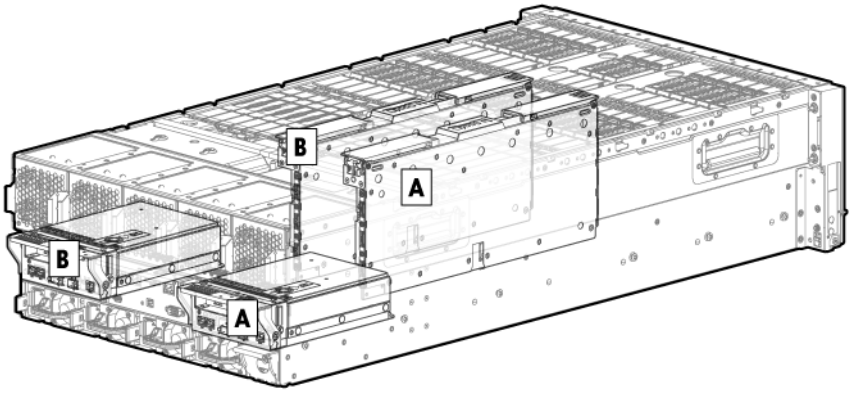
Item	Description
1	Cartridge row 1
2	Cartridge row 2
3	Cartridge row 3

Switch module and uplink module population rules

When populating switch modules and uplink modules, always install the two as a pair. The pairs are not required to be installed in any order as long as both the switch module and uplink module are in the same bay number.

- When installing a switch module in switch module bay A, install the uplink module in uplink module bay A on the rear of the chassis.
- When installing a switch module in switch module bay B, install the uplink module in uplink module bay B on the rear of the chassis. The switch module and uplink module are companion devices, and both are required for normal operation.

- All slots must be populated with either a module or a blank.



Power supply population rules

Two to four power supplies can be installed in the chassis. The required number of power supplies varies, depending on the configuration.

- A minimum of two power supplies is required to boot the chassis.
- A minimum of three power supplies is required to be redundant.
- A maximum of four power supplies can be installed in the chassis.

HP recommends using the HP Power Advisor to calculate the infrastructure required for your configuration and allow some flexibility for growth. HP provides power sizing tools on the HP website (http://www.hp.com/go/hppoweradvisor).

Fan population rules

Five fans ship standard with the chassis. Each fan contains two rotors.

- To boot and run the chassis, a minimum of five fans must be installed with at least nine operational rotors.
- For a redundant configuration, all five fans (10 rotors) must be installed and operating.

Hardware compatibility

Hardware compatibility matrix

The following hardware is supported in the HP Moonshot 1500 Chassis:

- HP ProLiant Moonshot Cartridges—Up to 45 cartridges per chassis
- HP Moonshot 1500 Chassis Management Module—One module required per chassis
- HP Moonshot-45G Switch Module—Up to two switch modules per chassis when paired with supported uplink modules
- HP Moonshot-6SFP Uplink Module—Up to two uplink modules when paired with supported switch modules
- HP 1200W Common Slot Hot Plug Power Supply—At least two power supplies per chassis
- Fans—Five fans required per chassis

Software compatibility

Software compatibility matrix

Supported and tested companion firmware and software must be installed on Moonshot components.

For more information about updating firmware on Moonshot components, see "HP Moonshot Component Pack (on page 15)."

For information about operating systems supported by HP Moonshot, see the operating system support matrices (http://www.hp.com/go/supportos).

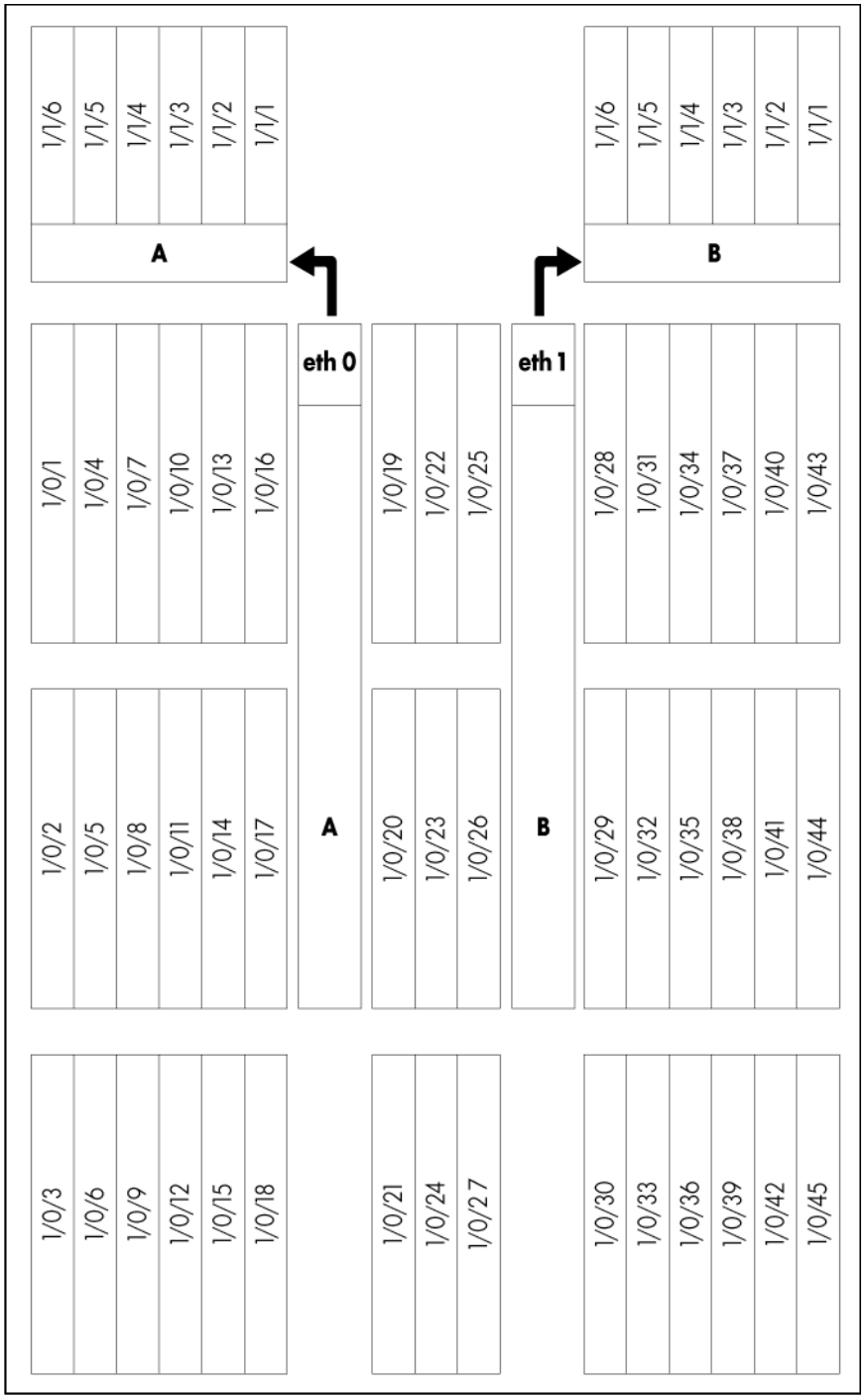
Device mapping

HP ProLiant Moonshot Cartridge mapping

Each HP ProLiant Moonshot Cartridge has two ports, with each port connecting to one of the internal network switch modules and its corresponding uplink module.

Understanding the software enumeration of Ethernet ports and the linkage to NIC/network hardware helps ensure that the network is properly configured and aids in troubleshooting.

The following image shows the networking layout, with each cartridge and uplink module labeled with the unit/slot/port naming convention.



The ID numbers shown in the image reference physical entities, such as cartridge slots and ports, by using a unit/slot/port naming convention:

- Unit: The stack member within a stack of switch modules
- Slot: The port location or type
  - 0 = a physical, internal port
  - 1 = a physical, external port

- 3 = a logical LAG port
- 4 = a logical VLAN routing interface

- Port: A specific physical port or logical interface being managed by a given slot
  - Physical ports for each slot are numbered sequentially, beginning with 1.
  - LAG port numbers range from 1 to the maximum number of LAGs that the switch module supports.

To determine the port mapping ID for a specific cartridge, determine the cartridge slot number and use the following table.

Cartridge slot number	**OS device name**	**Connects to internal switch module**	**Connects to external uplink module port**
<cartridge slot number>	eth0	Switch module A, port 1/0/<cartridge slot number>	Uplink module A, any port
<cartridge slot number>	eth1	Switch module B, port 1/0/<cartridge slot number>	Uplink module B, any port

The following table provides specific examples using cartridge slot numbers 24 and 45.

Cartridge slot number	**OS device name**	**Connects to internal network switch**	**Connects to external uplink module port**
24	eth0	Switch module A, port 1/0/24	Uplink module A, any port
24	eth1	Switch module B, port 1/0/24	Uplink module B, any port
45	eth0	Switch module A, port 1/0/45	Uplink module A, any port
45	eth1	Switch module B, port 1/0/45	Uplink module B, any port

Support and other resources

Before you contact HP

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)
- Product name
- Chassis serial number
- Product identification number
- Applicable error messages
- Operating system type and revision level

To obtain product information, log in to iLO CM firmware and use the `Show Chassis Info` command. For more information, see the *HP Moonshot iLO Chassis Management Firmware User Guide* in the HP Moonshot Information Library (http://www.hp.com/go/moonshot/docs).

HP contact information

For United States and worldwide contact information, see the Contact HP website (http://www.hp.com/go/assistance).

In the United States:

- To contact HP by phone, call 1-800-334-5144. For continuous quality improvement, calls may be recorded or monitored.
- If you have purchased a Care Pack (service upgrade), see the Support & Drivers website (http://www8.hp.com/us/en/support-drivers.html). If the problem cannot be resolved at the website, call 1-800-633-3600. For more information about Care Packs, see the HP website (http://pro-aq-sama.houston.hp.com/services/cache/10950-0-0-225-121.html).

Customer self repair

What is customer self repair?

HP's customer self-repair program offers you the fastest service under either warranty or contract. It enables HP to ship replacement parts directly to you so that you can replace them. Using this program, you can replace parts at your own convenience.

A convenient, easy-to-use program:

- An HP support specialist will diagnose and assess whether a replacement part is required to address a system problem. The specialist will also determine whether you can replace the part.
- For specific information about customer replaceable parts, refer to the maintenance and service guide on the HP website (http://www.hp.com/support).

Acronyms and abbreviations

CM

chassis management

CMU

HP Insight Cluster Management Utility

CSR

Customer Self Repair

iLO

Integrated Lights-Out

IPMI

Intelligent Platform Management Interface

LAG

link aggregation group

MCP

HP Moonshot Component Pack

MIB

management information base

SATA

serial ATA

SFF

small form factor

SFP+

enhanced small form-factor pluggable

Documentation feedback

HP is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback (mailto:docsfeedback@hp.com). Include the document title and part number, version number, or the URL when submitting your feedback.

Index

A

authorized reseller 24

B

before you contact HP 24

C

cartridge slot numbering 7
cartridges 9, 16, 21
chassis components 6, 7
chassis management 11
CMU 14
compatibility 14, 19, 20
configuration 16
configuration rules 16, 17, 18
contact information 24
contacting HP 24
CSR (customer self repair) 24
customer self repair (CSR) 24

D

device mapping 21
devices, identifying 6
documentation feedback 26

E

event logs 14

F

fan population guidelines 18
fans 12
features 5

H

hardware compatibility matrix 19
help resources 24
HP contact information 24
HP Insight Cluster Management Utility 14
HP Moonshot 1500 Chassis 6
HP Moonshot 1500 Chassis Management module 11
HP Moonshot Component Pack 15
HP Moonshot iLO Chassis Management Firmware 14
HP Moonshot-45G Switch Module 9
HP Moonshot-6SFP Uplink Module 10
HP ProLiant Moonshot Cartridge 9, 21
HP technical support 24
HP website 24
HP, contacting 24

I

iLO management zones 8
IML (Integrated Management Log) 14
Integrated Management Log (IML) 14
introduction 5

M

management zones 8

O

options 14
overview 5

P

phone numbers 24
population guidelines 16
power supplies 12, 18
product features 14
product overview 5

Q

QuickSpecs 14

R

required information 24
resources 24

S

software 14
software compatibility matrix 20

software resources 14
support 24
support and other resources 24
switch module 9, 17
switch module bay numbering 7

T

technical support 24
telephone numbers 24

U

uplink module 9, 10, 17
utilities 14

W

website, HP 24